EXPERIMENT NO. 6

TITLE: Electronic Modelling & Simulation of signal generation using MATLAB Simulink

AIM:

1. To generate different types of signals like sine, unit step, square, ramp, sawtooth, random etc using MATLAB Simulink
2. To display the waveform on the oscilloscope

APPARATUS: MATLAB software/tool, Signal generator, Controller etc.

THEORY:

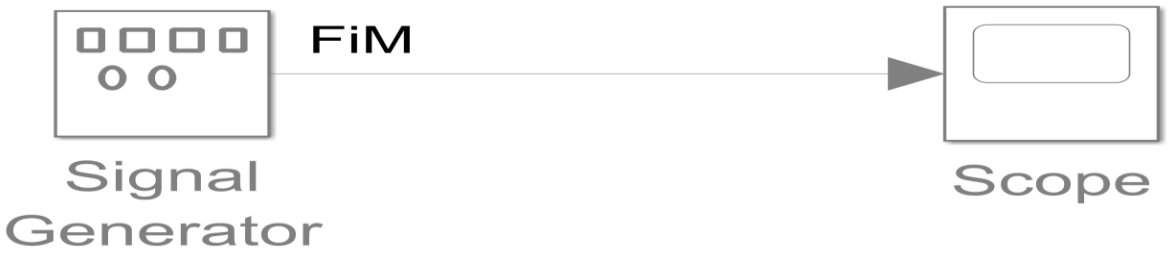
Generating signals using MATLAB Simulink is a common task in various engineering and scientific applications. Simulink provides a graphical environment for modeling, simulating, and analyzing dynamic systems. Here's a basic guide on how to generate signals using Simulink:

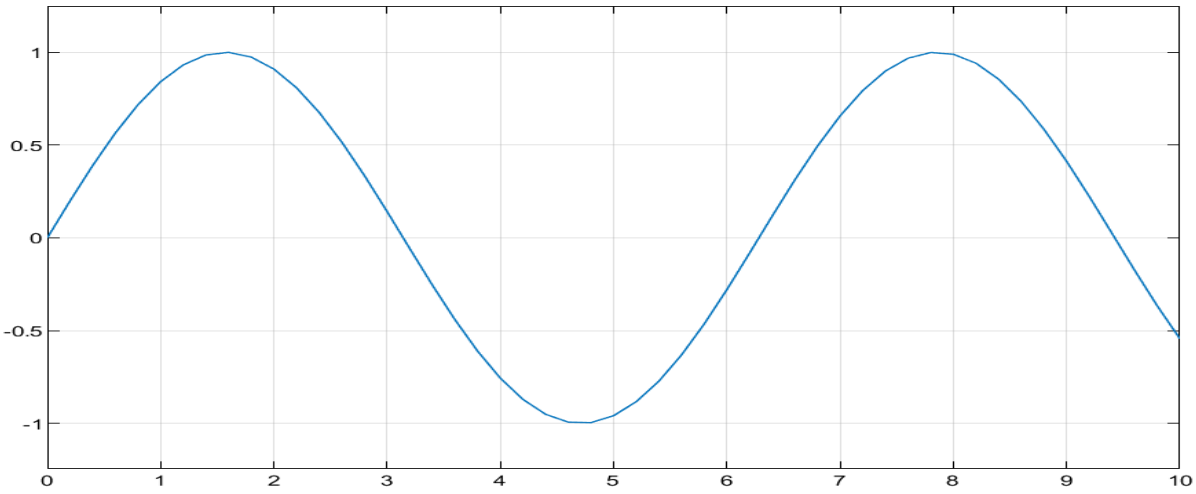
1. Open Simulink: Start MATLAB and open Simulink by typing simulink in the MATLAB command window.
2. Create a New Model: Click on "File" -> "New" -> "Model" to create a new Simulink model.
3. Add Signal Sources: Drag and drop signal source blocks from the Simulink library browser into your model. Common signal sources include:
    - Step Block: Generates a step signal.
    - Sine Wave Block: Generates a sine wave.
    - Square Wave Block: Generates a square wave.
    - Ramp Block: Generates a ramp signal.
    - Random Number Block: Generates random numbers.
4. Configure Signal Parameters: Double-click on each signal source block to configure its parameters such as frequency, amplitude, step size, etc., according to your requirements.
5. Connect Blocks: Use the connector lines to connect the output of the signal source blocks to other blocks in your model for further processing or analysis.
6. Simulate: Click on the "Run" button in the Simulink toolbar to simulate the model. This will generate the signals according to the configurations you set.
7. View Results: After simulation, you can visualize the generated signals using Simulink's built-in visualization tools. You can also log and plot signals using MATLAB scripts or Simulink's data logging capabilities.

8. Save Your Model: Once you're satisfied with your signal generation setup, save your Simulink model for future use.

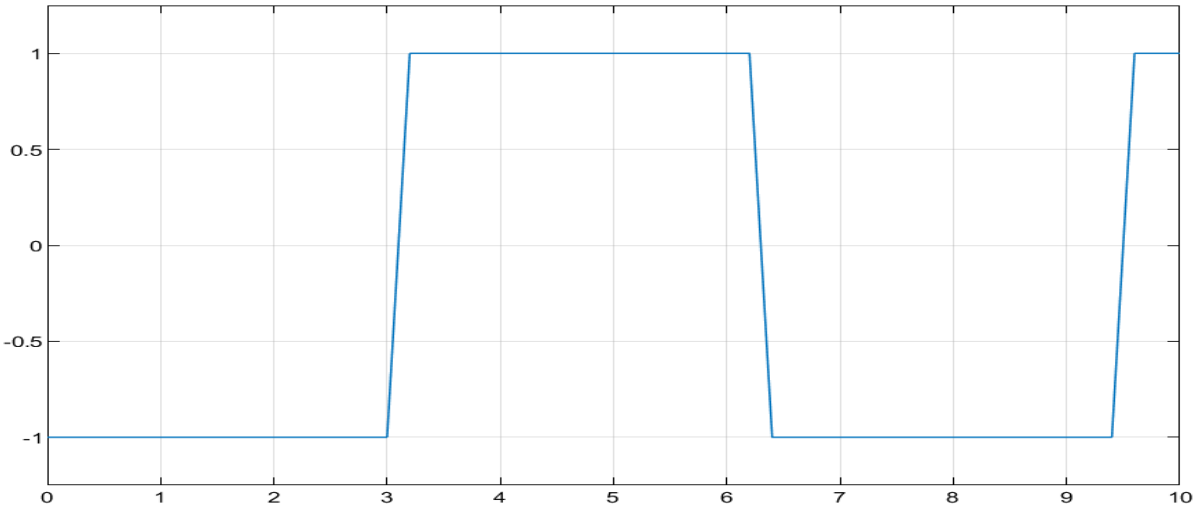
SIMULATION RESULTS:

Sine Wave Generation:

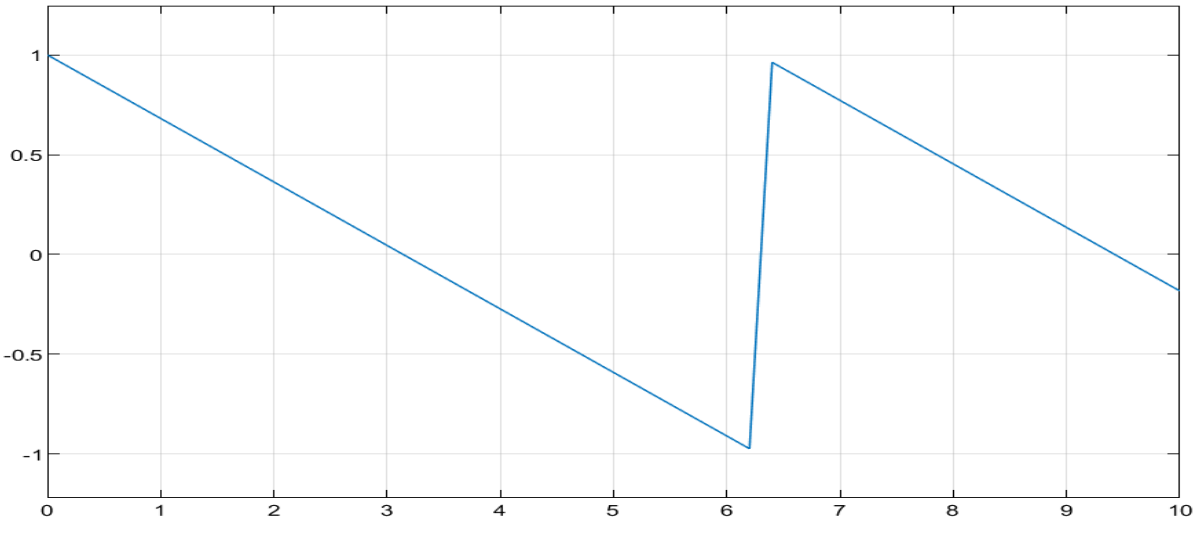




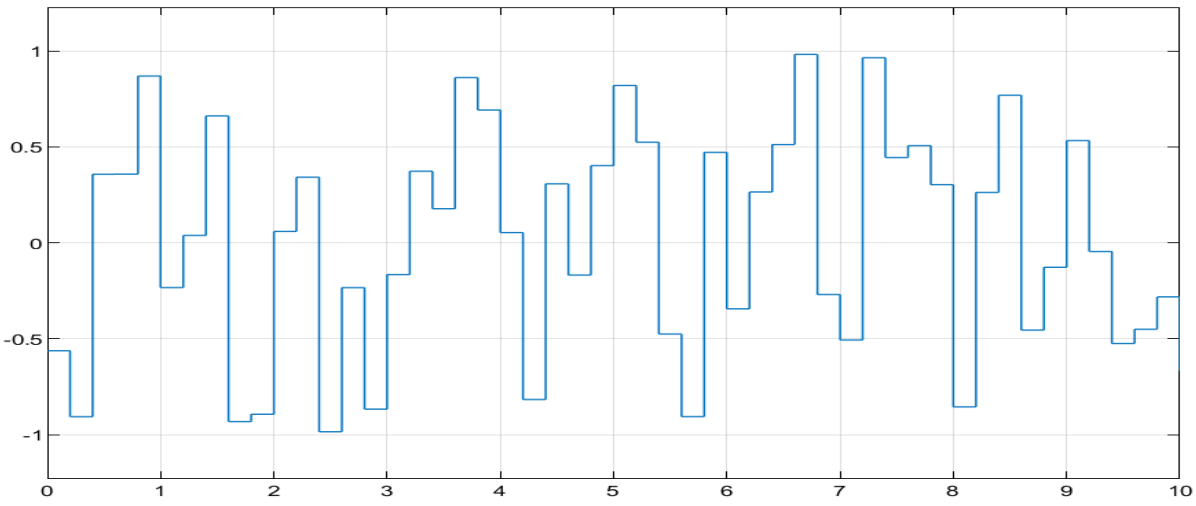
Square Wave Generation:



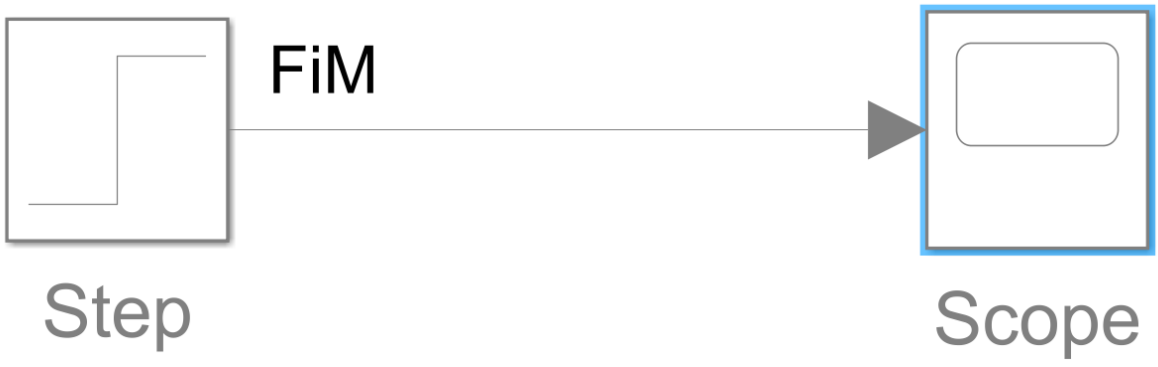
Sawtooth Wave Generation:

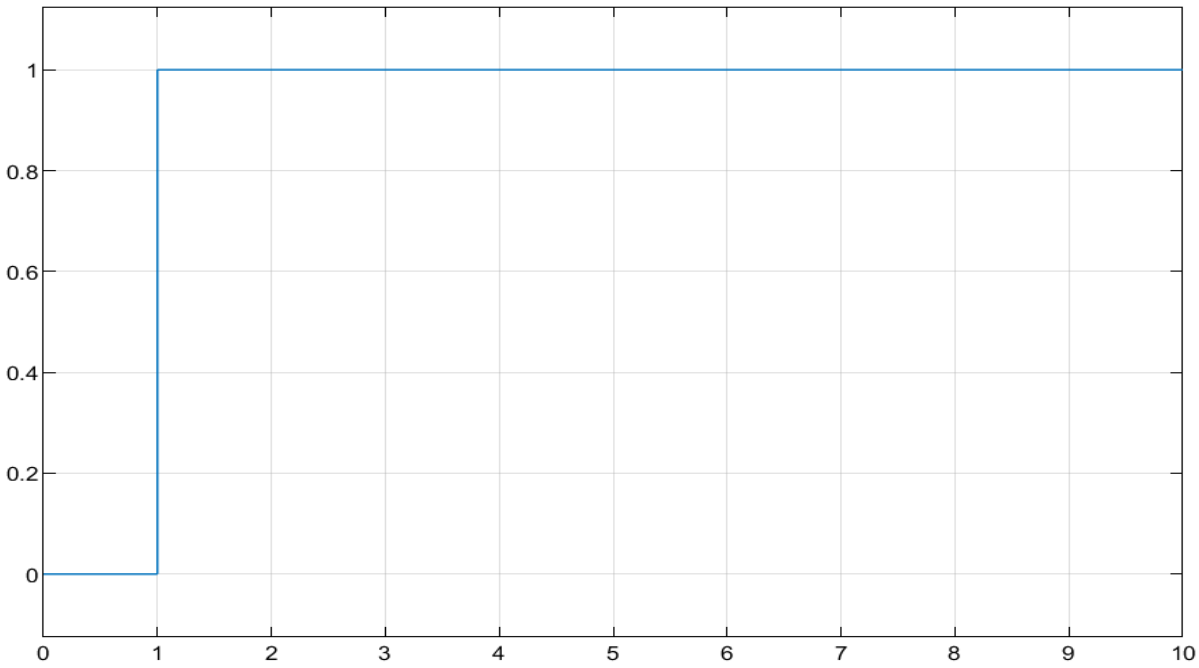


Random Signal Generation:

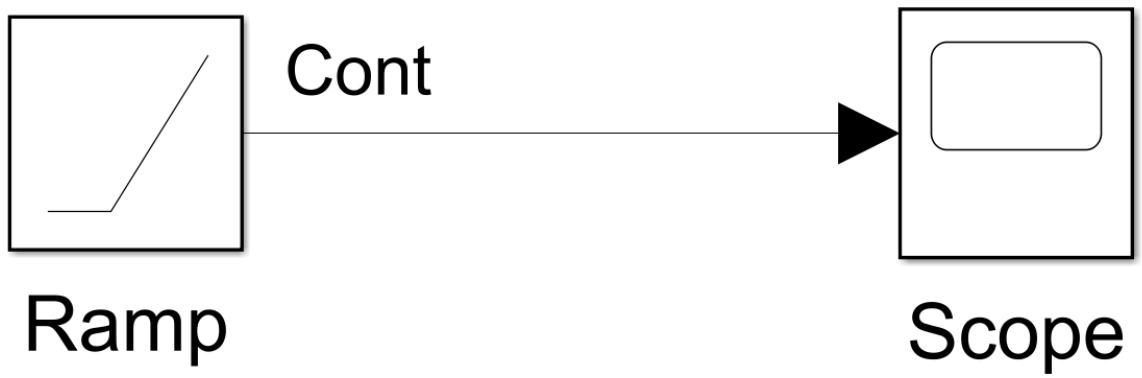


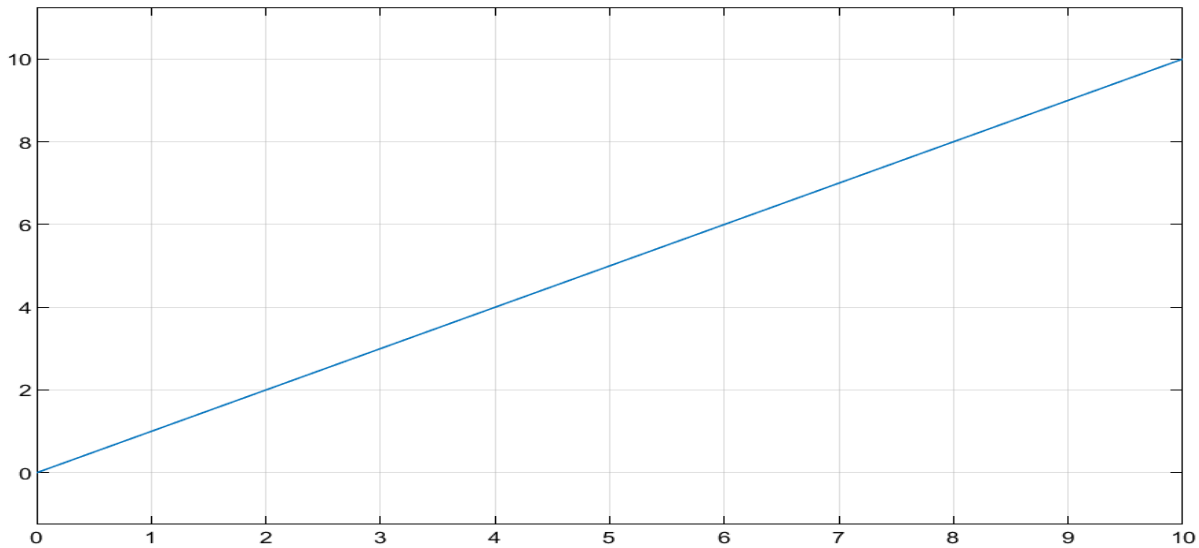
Unit Step Signal Generation:



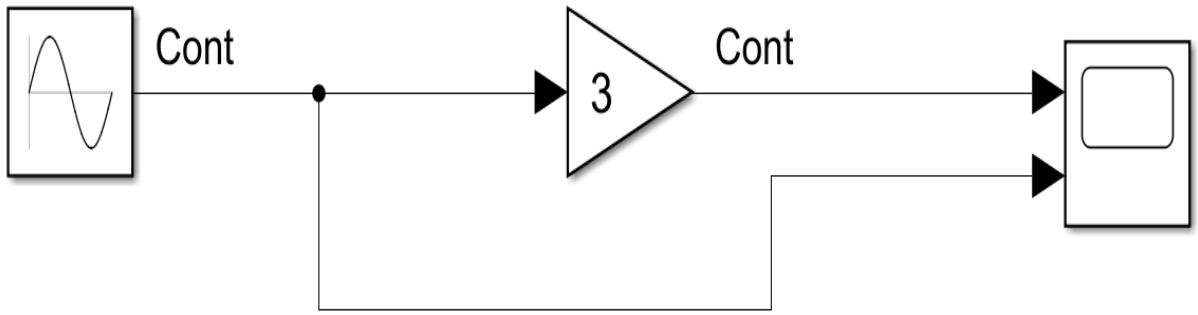


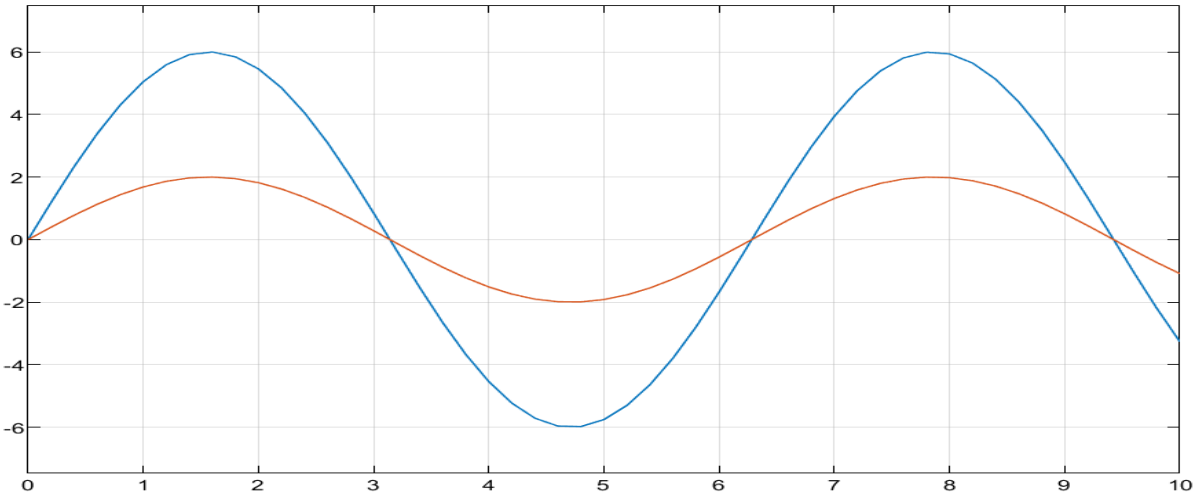
Unit Ramp Signal Generation:





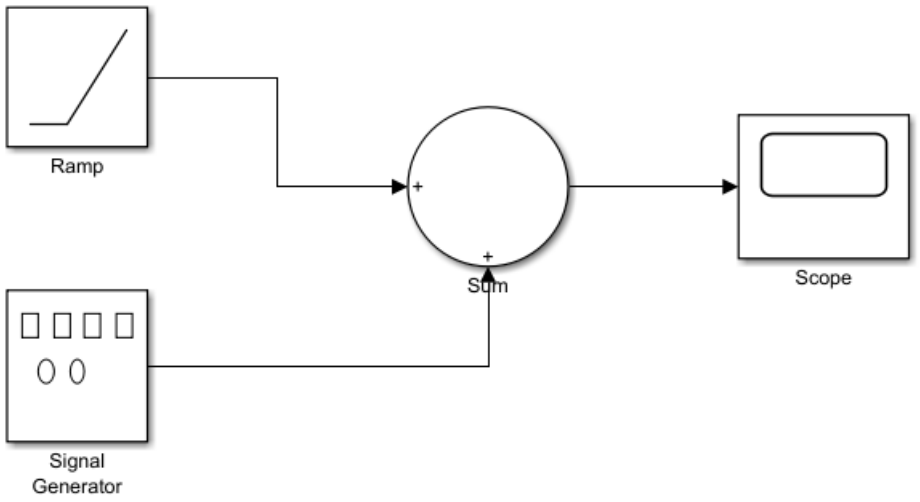
Signal Generation on 2 channels:

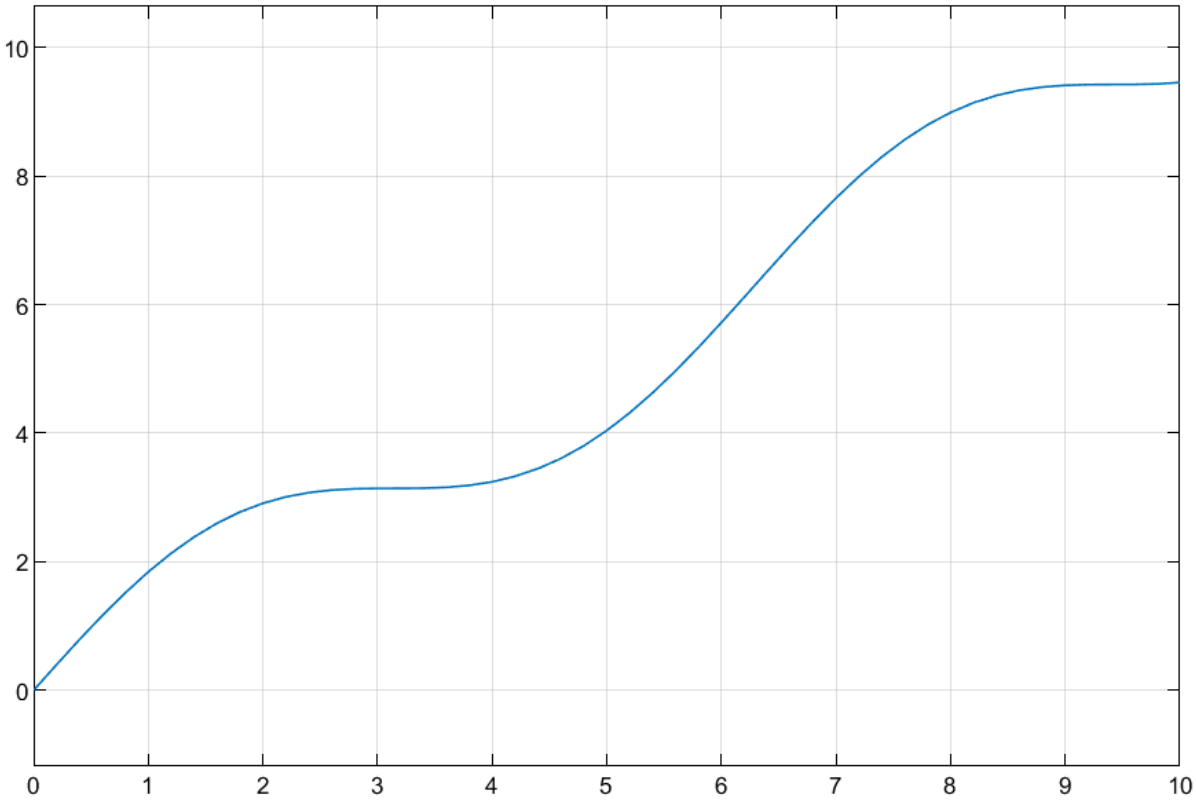




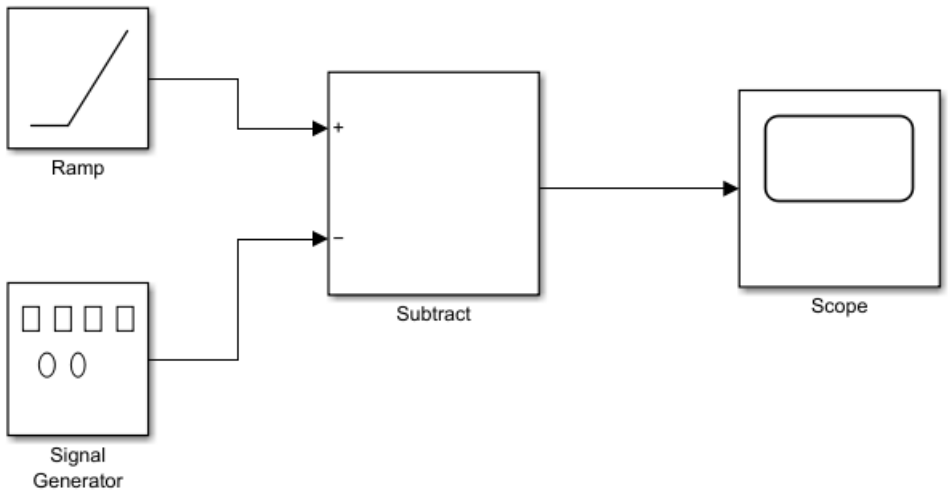
Mathematical Operations:

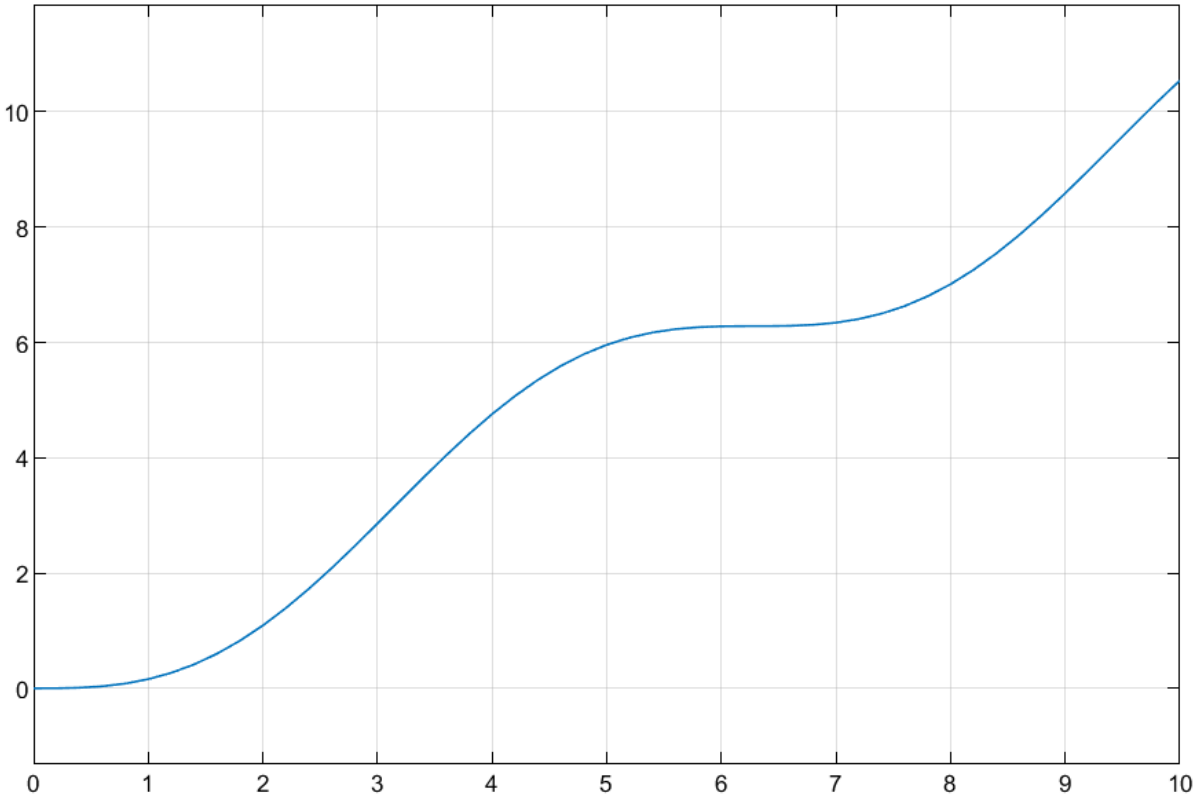
Addition of signals



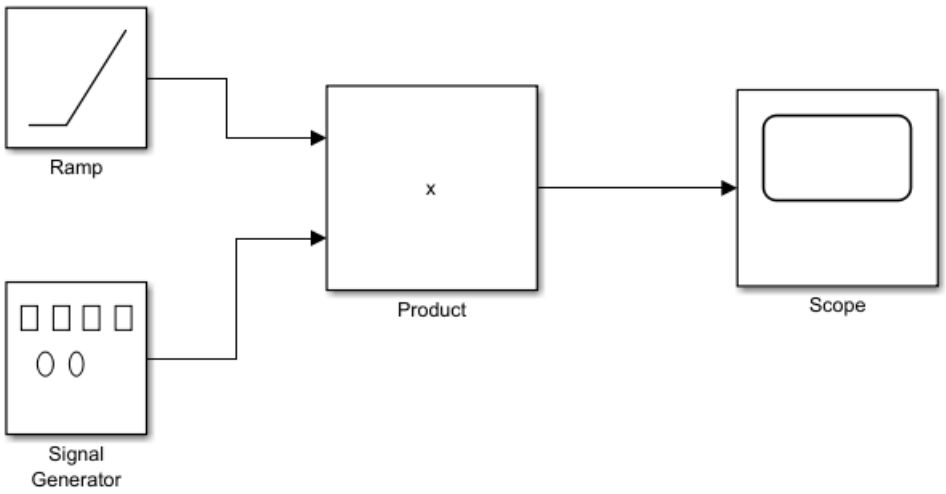


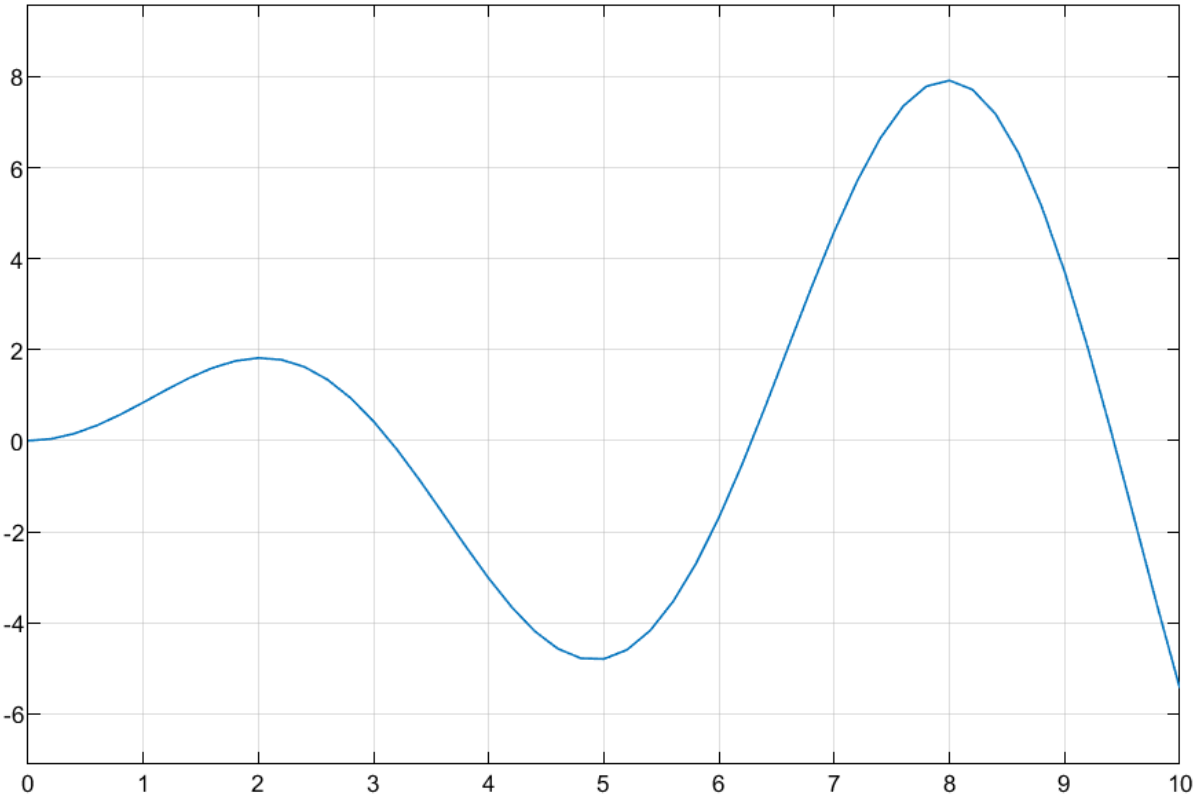
Subtraction of signals





Product of signals





ASSIGNMENT QUESTION:

Q. Create a Simulink block diagram representing a simple control system with a feedback loop.